# Asbestos

## 1. Information on asbestos

Asbestos is a general name given to several naturally occurring fibrous minerals that have crystallised to form long thin fibres. They are divided into two sub-groups: **serpentine** (chrysotile (white asbestos)), which was the most commonly used type of asbestos and **amphiboles**, which includes crocidolite (blue asbestos), amosite (brown asbestos), tremolite, actinolite and anthophyllite, of which crocidolite was the most commonly used. Blue and brown asbestos are considered to be the most dangerous. The importation, supply and use of white, blue and brown asbestos have been banned.

Asbestos fibres do not dissolve in water or evaporate; they are resistant to heat, fire, chemical and biological degradation and are mechanically strong. Such properties made it an ideal material for use in a number of products, including insulation material for buildings, boilers and pipes; insulating board to protect buildings and ships against fire; asbestos cement for roofing sheets and pipes. The amount and type of asbestos found in the fabric of buildings depends on the product. Crocidolite and amosite were used for lagging up to 1960s. Asbestos-cement products contain 10-15% asbestos fibre, generally chrysotile. Asbestos containing products found in fires include roof tiles and asbestos-bitumen roof coatings.

## 2. Exposure

The main route of exposure of asbestos fibres is through inhalation and to a lesser extent ingestion.
The potential for fibre release from Asbestos containing material (ACM) depends on three principal factors:

- the type of material/asbestos
- the integrity of the material
- any sealant or enclosure

The concentration of respirable asbestos fibres in air at locations around the site of the fire will depend upon a number of factors including: the quantities of respirable asbestos released; the heat generated by the fire; the distance from the fire; the meteorological conditions; and the type of surfaces onto which fall-out occurs. Rain will have a particularly significant effect as it enhances deposition of the fibres onto the ground and hence removal (to drains etc).

**Dermal exposure**

- wash any potential sites of skin contact with copious amounts of water or soapy water
- other measures as indicated by the patients clinical condition

**Ocular exposure**

- if symptomatic, immediately irrigate the affected eye thoroughly
- for patients at home, use lukewarm tap water, trickled into the eye or in a small cup held over the eye socket; an eye dropper is an alternative
- in hospital, 1,000 mL 0.9% saline at room temperature by an infusion bag with a giving set is appropriate, irrigate for 10–15 minutes
- refer for ophthalmological assessment if there is doubt regarding the management of corneal damage
- other supportive measures as indicated by the patient's clinical condition

**Inhalation**

- treatment other than symptomatic management is unlikely to be required after acute exposure

**Ingestion**

- treatment is unlikely to be required following acute ingestion

## 3. Health Effects

Asbestos is generally not considered to be acutely toxic, as few immediate effects are observed following exposure. Short-term high level inhalation exposure to asbestos has been associated with lung cancer, mesothelioma and pleural disorders such as pleural plaques. Such effects may be observed following a latency period of approximately 30 years. Epidemiology studies have shown that chronic inhalation of all types of asbestos fibres is associated with asbestosis, pleural abnormalities, mesothelioma and lung cancer. Chrysotile (white asbestos) is recognised to be less potent regarding carcinogenicity than amosite or crocidolite.

The smoke produced by the fire could be irritant to eyes and have an irritant effect on those with chest problems e.g. asthma. There should be no long-term effects associated with a brief exposure to this smoke.

## 4. Air sampling

Chrysotile (white) asbestos is more common and less hazardous than amphibole types such as crocidolite (blue) and amosite (brown). If the presence of amphiboles is suspected then it is important to verify and at what level. Monitoring may be appropriate for large incidents for public reassurance purposes. This is a decision that needs to be taken on a case by case basis. Analysis may take time and action will likely be needed before results confirm quantity and type of asbestos present.

## 5. World Health Organisation (WHO) guidance on air quality (WHO, 2000):

This guidance states that asbestos is a proven carcinogen for which no safe air concentration level can be proposed because a threshold is not known. However, the WHO

report does note that a number of groups have proposed that limiting the concentration of asbestos in air to 0.0005 fibres/ml (f/ml) would provide adequate health protection.
WHO has concluded that epidemiological studies do not support the hypothesis that an increased cancer risk is associated with the ingestion of asbestos in drinking-water. They therefore concluded that there is no need to establish a guideline for asbestos in drinking water.

## 6. Decontamination at the Scene

The approach used for decontamination at the scene will depend upon the incident, location of the casualties and the chemicals involved. Therefore, a risk assessment should be conducted to decide on the most appropriate method of decontamination.
Following exposure to asbestos it is important to try and prevent the dispersal of dust and fibres. Do not rub exposed areas as this can disturb the fibres. Remove all visible dust and fibres from the body, clothing and footwear by wet wiping with a damp cloth using a gentle patting action. Remove any contaminated clothing (not over the head) and place in a bag and seal.

## 7. Clean up and waste disposal:

Handling asbestos materials is a specialist task requiring appropriate training and equipment, including personal protective equipment (PPE). In a well-organised response it should be possible for all significant fallout to be removed within 48 hours. If the clean-up is performed in an appropriate manner the level of asbestos contamination in the affected area will be minimal. Thus the potential for long-term environmental exposures and thus the associated risk will be minimal. Asbestos wastes are defined are hazardous wastes.

## 8. Asbestos regulations

Worker exposures must be below the airborne exposure limit (Control Limit). The asbestos regulations have a single Control Limit for all types of asbestos of 0.1 f/ml. A Control Limit is a maximum concentration of asbestos fibres in the air (averaged over any continuous 4 hour period) that must not be exceeded. In addition, short term exposures must be strictly controlled and worker exposures should not exceed 0.6 f/ml of air averaged over any continuous 10 minute period, using RPE(respiratory protective equipment) if exposure cannot be reduced sufficiently using other means.

## 9. Consider

- Advise shelter from the plume and fallout debris by remaining indoors and closing all external doors and windows
- Not all asbestos containing material will be involved in the fire

- Fibres may be entrapped in larger pieces of material and therefore not released – the public should be warned not to step on or handle these fragments pending the clean-up operation, as this could release asbestos fibres
- Respirable fibres will be a fraction of the total released
- Some fibres will be "denatured" at the temperatures involved
- Atmospheric dispersion and deposition (particularly from rain) will reduce concentrations
- Duration of exposure will be short
- Appropriate clean-up will significantly reduce risk of exposure

**References & Resources**

Public Health England (2017) Asbestos Incident Management https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/627191/Asbestos_incident_management.pdf

Public Health England Compendium of Chemical Hazards Asbestos https://www.gov.uk/government/collections/chemical-hazards-compendium

Health Protection Scotland (2007) Guidance Note 15 Asbestos www.hps.scot.nhs.uk/

HPA CHaPD, The Public Health Significance of Asbestos Exposure from Large Scale Fires https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/457966/HPA-CHaPD-003.pdf